

**MEETING REPORT**  
**of the**  
**Planetary Sciences Subcommittee (PSS)**  
**NASA Advisory Council Science Committee**  
**NASA Headquarters**  
**18-19 April 2011**

***The next meeting of the PSS is a telecon in June (Date/time TBD) to review the HQ written response to the decadal survey (this will replace the planned July Telecon)***

*Meeting Goal: To hear about the results of the decadal survey and the initial HQ response, formulate ideas for implementation, and assess how the decadal results mesh with the current PSS SR&T study.*

**Day 1:**

The Planetary Science Subcommittee (PSS) of the NAC Science Committee met for two days at NASA HQ April 18-19, 2011. The meeting opened with welcoming remarks by Jim Green (Director, Planetary Science Division (PSD)) and Ron Greeley (PSS Chair). Agenda and presentation materials with detail are available on the informal PSS web site (<http://lpi.usra.edu/pss>).

The meeting began with the standard annual ethics briefing. If any committee members have ethics questions, the HQ ethics team can be reached at 202-358-2465, or [ethicsteam@hq.nasa.gov](mailto:ethicsteam@hq.nasa.gov)

Larry Soderblom presented an overview of the decadal survey.

Jim Green discussed the initial HQ reaction to the decadal. He also provided some insights from the recent ESA/NASA bilateral, and talked about how SMD and PSD fared in the finally passed 2011 budget.

**FY11 Budget:**

The recently passed 2011 budget for PSD is about \$1440M (still under agency review). While that number is less than the President's FY12 request (\$1485.7), it is significantly higher than the FY10 budget (\$1364.4).

The passing of a budget allows PSD to finally provide realistic budget targets for R&A programs and thus, the discipline scientists can now go back and make awards to as many of the previous "selectable" proposals as funding allows.

Jim Bell asked if the better-than expected 2011 budget meant that selections could now be made for the NEO observation call, however, because those proposals are now so old and this year's proposals are coming in, it was decided to move forward with this year's process rather than revisiting last years.

The passing of the budget does mean that Discovery-12 and New Frontiers-3 decisions are on track and expected this spring (Apr/May for D-12, May/June for NF-3).

Because this budget is a CR, there is no new authority to allow for Plutonium-238 restart, but this is recognized by the decadal and HQ as a high priority. Ron will bring it forward to the full Science Committee as well, just to keep the issue at the forefront so it does not get overlooked. *[Ed note: subsequent discussions reveal that it may be possible to move forward this year and PSD is talking with DOE to see if we can make it happen]*

#### **Bilateral discussions with ESA:**

The 2016 Mars Trace Gas Orbiter passed KDP-A on Mar 29<sup>th</sup> and is progressing well. There are some issues with the timing of the delivery of the US instruments that are being worked.

The US and ESA have agreed to study a single-rover architecture for the potential 2018 mission. This will be a truly “joint” mission, different from previous activities, which have typically been led by one agency with the other contributing instruments or other elements. The US has agreed to provide the descent stage (built-to-print from MSL) and likely the launch vehicle, while ESA will provide a drill, other responsibilities have not yet been decided. A joint engineering working group has been formed and a science working group is now forming. There was some concern among the committee that science, not engineering, should drive the rover architecture and it was encouraged that the science working group work very closely with the engineering team to ensure that science goals can be met with whatever architecture is decided upon. PSD has budgeted about \$1.2B + launch vehicle for this mission. ESA has a major decision gate on their side in late May; it is hoped that by then the basic architecture will be decided and the ESA/NASA responsibilities will be delineated.

Julie Castillo-Rogez asked if ESA would participate in the other two missions required for Mars Sample Return. Doug McCuiston said yes, they are quite interested, they have been working on some technical developments, and the letter expressly says that the 2018 mission is preparation for joint sample return.

Louise Prockter asked about the timing of assembling the 2018 mission. On the US side, September is when we need input for the 2013 budget, on the ESA side, there is a big milestone in mid-2012, the Ministerial council, which is a 5 yr review of their programs. Following Louise’s question, Will Grundy asked how you decide when you “fail to fit into the box and you move on to the next box.” Jim said that their “existence proof” budget was able to close, obviously along the way there will be different interactions with the budget every year, but you have to start somewhere.

#### **Decadal and Budget Planning:**

PSD has undergone a budget planning exercise to understand the implications of the decadal recommendations, understanding that the full decadal recommendations greatly exceed the Presidents FY12 budget. After laying in our current commitments, including all missions currently operating, in development or in competition, as well as \$10M set aside, per OMB, for cooperative activities with human exploration (matched by \$20M in ESMD's budget), a "notional" budget was developed with the following characteristics:

- R&A capped at \$200M/year
- Next Discovery AO on current >36-month cadence. All subsequent AO's accelerated to 24-month cycle
- Select NF-3, plan for NF-4 and NF-5 within decade (maintains New Frontiers schedule)
- Provide extended mission budget for ALL operating missions with a bi-annual Senior Review used to determine which missions to be extended
- Dedicated Lunar R&A wedge transferred to PSD R&A
- Residual Lunar Quest Program moved to Discovery
- JEO descoped to studies funded FY11/12. No JEO Instrument AO, but budget for some radiation technology efforts
- Mars2018 joint with ESA

Louise asked, at what point do you decide that maintaining Discovery and New Frontiers is more important than the partnership with ESA? Jim responded that we really have to give the partnership with ESA a fair chance, it may not work, but we have to let it play out.

John Grant asked about funding for extended missions, which are not included in the current budget WAG. Priorities for funding extended missions will be decided by a senior review process that will look across the division at all operating missions to determine priorities. This is similar to the process used by Heliophysics.

Sanjay Limaye asked what steps are possible to look at some of the lower priority flagships listed in the decadal (i.e. Venus Climate Mission). Jim replied that we need to look at all of them. Obviously we've started out hard and fast with the first two, but eventually we need to look at all of them.

Mark Sykes expressed concern over the perceived "end of the Mars program" and suggested that simply including Mars in the Discovery program was insufficient. Larry Soderblom noted that with MER at Endeavour Crater, MSL, and MTGO, it's already a pretty full decade for Mars. Dave Des Marais noted that even without bringing samples back, the 2018 mission will do good science.

Clive Neal asked, with Lunar Quest ending, what is the future of the NLSI program? Jim said that he had been discussing with Yvonne Pendleton how the institute might evolve. Jim also noted that NLSI was designed as a joint project with ESMD and that we now have money set aside in both divisions to work together.

Louise asked if there were “lessons learned” from the decadal process. Larry said yes, lots, particularly the timing. While we are somewhat hamstrung by NRC procedures and deadlines, it would be good if next time it wasn’t on top of another major community activity (like NF-3). Also, it was helpful to have a technology person on every panel, and it was a really good idea to split up astrobiology and incorporate that within each of the other panels. Curt Niebur also noted that a survey about how the concept studies worked is being sent out.

Sanjay wondered if the white papers would still be available after the NRC link goes away. Jim noted that they will be available permanently at <http://solarsystem.nasa.gov/2013decadal/>. Many of them are also available on the various AG websites.

Greg Herzog asked if the lack of inclusion of an asteroid sample return mission in NF-4 was a deliberate attempt to influence the NF-3 selection. Larry said emphatically no, just a result of the attempt to balance the list among the panels and both the Trojan and comet missions were ranked higher than asteroids this time. Bill McKinnon noted that it might be possible to do asteroid sample return under a Discovery budget.

Mini Wadhwa asked about the PSD technology study (led by Tibor Kremic) that is finishing up, how will it mesh with the decadal and what is the timeline for taking up the recommendations of that study? Jim responded that we are really taking a hard look at how to manage tech development more effectively and expect to start implementing those changes in 2013. As part of the overhaul, PIDDP and ASTID will be taken out of the R&A program and put into the technology development budget line, though the names “PIDDP” and “ASTID” are likely going away and will be replaced by a new program that will include in space propulsion, sterling generators, as well as investing in both low and higher level TRL technologies.

### **Breakout Groups**

The final part of day 1, the committee broke out into 3 groups – R&A, Mars, and outer planets – to provide general impressions and specific recommendations on the decadal survey for those areas, in particular the Mars and outer planets groups were asked to focus on the Flagship descope process for their respective missions, and the R&A group was tasked to integrate the decadal survey into the SR&T study and also to look at specific questions posed by the R&A discipline scientists.

### **Day 2:**

Jim began the day with a few slides on some of the extraordinary missions and science PSD will be doing as we continue through the “Year of the Solar System.” He also explained a bit about the process that PSD has begun to develop a response to the decadal. PSD has gathered a list of 35 things from the survey for which we will

prepare formal responses. The next step is to draft those responses, assignments have been distributed across PSD and those drafts are being prepared now. The draft will then be brought to the PSS. The next PSS telecon was scheduled for late July, but it was decided that that should be moved up to June to provide a more timely response.

Jim then took some Q&A.

Julie asked about working across disciplines within SMD, particularly with Earth Science. Jim was delighted to see comparative planetology mentioned in the decadal. He is thinking about some sort of R&A call in comparative planetology, also talking about a joint call with Heliophysics, both divisions have expressed interest but haven't yet made any commitments. Comparative planetology has been tried before, but sort of fizzled out, largely due to a lack of planetary data, but that has really changed in recent years, so it's a good time to try again.

Clive asked if LASER will be getting any contribution from Exploration dollars. Jim said they were working on that, noting that in the past, they had been funding LASER through ESMD reserves, which are not stable from year to year and that has caused problems, but now there is money set aside within ESMD to work with SMD. Clive also asked if OSEWG (Optimizing Science and Exploration Working Group) would be reconstituted or replaced, Jim said that, yes, we don't yet know the form that will take, but it is important to have that level of interaction. Ron also noted that Waleed Abdalati (NASA Chief Scientist) is also working to better coordinate between SMD and human space flight.

### **NASA chief scientist Waleed Abdalati**

As if on cue, Waleed himself showed up and took some questions from the committee, noting that the community did a great job with the decadal, particularly in using realistic cost assessments and providing clear decision rules. He reminded the committee that it is their job to help NASA to figure out how to be true to the decadal under changing conditions (i.e. smaller budgets).

Clive asked again about OSEWG and Waleed replied that a working group is the right thing, but the exact details of what that will look like are still being formed.

Jim Slavin asked if it is Waleed's job to promote cross-division/cross-directorate discussions. Waleed replied yes, cross-directorate, but that he prefers to leave management of divisions to division directors.

Mark noted that NASA is often not perceived as a science agency (for example, we weren't included in the America COMPETES act), but often looked at more as entertainment, a luxury that can be cut in lean times. It is his hope that now that we have a chief scientist, we can work towards recasting that image. Waleed replied that he believes that is his biggest challenge. His metric of success for this position is whether, when people think of NASA, science immediately comes to mind.

Waleed concluded by noting that humans want two things: they want to explore, and they want to survive. NASA helps them do both things and that is the message we all need to carry forward.

### **Highlights from the Outer Planets Breakout Group**

OPAG endorses a program that includes a mix of PI-class Discovery and New Frontier missions, as well as more capable, but less frequent, Flagship missions, to multiple destinations in the solar system. OPAG encourages NASA to develop a comprehensive framework for its flagship decision process, including decision timelines, technical readiness, independent STMC (Science, Technical, Management, and Cost) reviews, resource requirements, and schedule and urges NASA to work in an open manner with the community via PSS and the AGs as it rebalances the PSD portfolio to implement the recommendations of the decadal.

Innovative, focused outer planet missions are possible in smaller mission classes, even Discovery class with modified parameters (offering GFE technologies including ASRG, increasing the cost cap, removing the launch vehicle from the cost cap, etc.).

OPAG strongly endorses the recommendation that NASA vigorously pursue international cooperation in planning and executing planetary missions in the Outer Solar System. OPAG fully endorses the ESA Jupiter Ganymede Orbiter (JGO) mission concept. OPAG also strongly urges continued NASA investment in a variety of mission concept studies and their independent review, starting with the top flagship priorities listed: Mars, Europa, and Uranus.

### **Highlights from the Mars Breakout Group**

The Mars community has responded positively to the decadal survey and are happy that Mars2018 has been designated as the #1 flagship priority, however, they would like to emphasize that MSR is NOT the consummation of the Mars program, but it is rather the NEXT KEY STEP in an ongoing highly productive program that has much more to accomplish. They also applaud the inclusion of Mars within the scope of the Discovery program.

MEPAG also strongly endorses international collaboration, particularly the NASA/ESA joint Mars efforts in 2016 and 2018.

As the decadal advocates, focused technology development programs deserve robust and stable funding. They are essential for achieving critical-yet-challenging exploration objectives, like sample return. In addition, these programs will greatly facilitate the key missions to follow in the subsequent decade.

The NASA caching system and the ESA subsurface drill are both essential components of the Mars2018 mission needed to address the highest priority science objectives for both agencies. MEPAG recommends issuing a draft AO for arm and

most instruments on 2018, and also recommends that AOs be released simultaneously in the US and Europe, such as was successfully done with TGO.

### **Highlights from the SR&T Breakout Group**

The SR&T breakout group understands that a declining PSD budget does not allow for the strict implementation of the Decadal recommendation of the 5% increase plus additional annual increases. However, the group feels that implementation of the decadal language supporting increased funding for these programs would, at a minimum, call for an FY11 budget level no less than the FY10 level, with no cuts to the R&A programs going forward. It is not clear that the proposed flat budget of \$200M for R&A programs going forward meet this criterion. Additional information should be provided to PSS that demonstrates this to be the case, or the funding should be increased to a level that meets this condition. In determining the FY10 funding level for R&A programs, funds rephased to FY11 should be included.

The specific decadal recommendation for increased funding for R&A by 5% with subsequent years increasing with inflation plus 1.5% should be revisited from year to year in the context of updated budget prospects for PSD with the intent of implementing that recommendation when the budget environment improves.

Additionally, the group recommends that funding for the R&A program should not be diluted by the inclusion of significant new responsibilities. Such new responsibilities added to the R&A program should be accompanied by the additional funds needed to support it

The committee strongly encourages NASA to find ways (e.g., by merging related research programs and lengthening award periods) to increase average grant sizes and reduce the number of proposals that must be written, submitted, and reviewed by the community. However, this recommendation should not be implemented without modeling the effects of such changes to understand unintended consequences, including their potential impact on the workforce. Furthermore, any consolidation of programs (e.g., to reduce subject overlap) should be done in a way that preserves net funding to the programs.

The group also endorses the idea that NASA should periodically evaluate the strategic alignment and funding level of all its SR&T programs to ensure they remain healthy and productive.

In addition to discussing the decadal, the SR&T group was asked to address three questions from the PSD discipline scientists. The questions and responses are as follows:

#### ***1. In detail, what would the goal or goals be of any revamping of the R&A program?***

To enhance the scientific productivity of the program by reducing the pressure

on scientists to write proposals, improving the efficiency of proposal reviews, and improving the ability of program officers to efficiently manage their respective programs.

***2. What approaches would PSS recommend to accomplish this goal (or these goals) if grant size, grant duration and success rate could not be increased?***

Independent of these possibilities, NASA should hire program staff whose job is to support program officers. NASA should increase the number of program officers, which have been found by a recent NRC study (An Enabling Foundation for NASA's Space and Earth Science Missions, 2010) to be critically understaffed.

In addition, internal controls of program funds should be improved that would not allow financial analysts to modify program budgets without prior approval by or knowledge of program officers and/or the division director. Program officers waste too much time trying to figure out how much funding they have available to their program against their expectations as managers.

There also needs to be improvement in the IT support for program officers by NSPIRES and NRESS regarding corporate memory of their programs – allowing access to records of past reviews, panel members, external reviewers. Contracts should be modified as necessary to ensure that this and other information of value to NASA is always delivered to a database that can be accessed and queried by program officers.

Program consolidation may also advance this goal by reducing subject-matter duplications across programs, however this should only be undertaken in a funding-neutral way.

***3. Given that the President's FY12 budget proposal included a decreasing PSD budget, should PSD alter its goal of encouraging early career researchers (through NESSF, ECF, etc.) or alter any of its programs?***

No. These are important programs for establishing new scientists, beginning with graduate students. Early career programs generate a number of new scientists and, in the case of ECF, should be strengthened by lifting restrictions on proposer qualifications, including extending the maximum number of years since PhD from 5 to 7 (since in the first 5 years, many people are in post-doctoral positions at institutions that do not allow them to submit proposals) and removing the requirement barring a proposer from being in a tenure-track or other permanent position.

**Planetary Analysis Group (PAG) Reports**

Each PAG chair of the remaining PAGs (VEXAG, SBAG, CAPTEM, LEAG) gave brief reports on their group's response to the decadal. Some key items include:

- a) Sanjay Limaye reports that “VEXAG loves the decadal survey.” However, Sanjay expressed some concern that the size of the Venus community (supported by only ~3% of the R&A budget) has fallen below the critical mass, making it difficult for research panels to include knowledgeable scientists. VEXAG will be pursuing the creation of an International Focus Group for the Venus Climate mission recommended by the Decadal Survey and urges NASA to embark on forming a Venus Climate Mission Science Definition Working Team.
- b) SBAG chair Mark Sykes notes that “the decadal survey is good” for the small bodies community. However, SBAG is concerned that the pursuit of Flagship missions in this budget environment may jeopardize the implementation of decadal recommendations for smaller missions, research and analysis programs, and technology. SBAG also notes that the recommendation that the Discovery program call allow space-based telescopes to be proposed should include both survey facilities (analogous to WISE) and user facilities (analogous to HST and Spitzer).
- c) Mini reports that the CAPTEM response to the decadal survey was “extremely positive.” They are looking forward to assisting with planning and implementation of a long-term curation plan, including planning for MSR, as well as additional lunar, asteroid and/or cometary samples from Discovery or New Frontiers missions, if selected. They also encourage technology development in support of collection and curation (e.g., development of cold curation capabilities)
- d) Former LEAG chair Clive Neal (pinch hitting for Chip Shearer) reports that the lunar community is “overwhelmingly supportive of the decadal.” The community strongly supports further SMD/ESMD joint missions, like LRO, as well as international cooperation and collaboration in lunar missions and science. LEAG is also interested in finding ways to leverage the Google Lunar X-Prize or other private sector ventures to achieve lunar decadal goals.

### **Action Items**

- Next telecon in June, watch for doodle poll and look over the PSD response to the decadal and be ready to discuss.
- Review the minutes from previous meetings by the end of the week.
- Watch for the draft of the SR&T report (v. 10) with new decadal survey comments added. Mark will send to Ron by the end of the week, Ron will send out 1 week later.
- Jim will ensure that all the decadal white papers are made permanently available at [solarsystem.nasa.gov](http://solarsystem.nasa.gov), and the PSD response will also be posted to this website when complete.
- Jonathan will look into extending the expiring members stints through the June telecon.